

Appl. No.: 10/034,817
Amendment Dated January 28, 2005
Reply to Office Action of September 28, 2004

REMARKS

Favorable reconsideration by the Examiner is respectfully solicited in light of the above amendments and the remarks which follow.

Claim 1 has been amended to incorporate language previously presented in Claim 7. For this reason, the present amendments do not introduce new matter or raise new issues, and therefore entry of this amendment is clearly appropriate.

The present invention relates to a nonwoven fabric having improved physical performance and aesthetics, and in particular, to a fabric having aesthetically pleasing tactile properties, commonly referred to as softness or a "soft hand". The present invention achieves these properties without sacrifice in other desirable properties, such as abrasion resistance.

This is achieved in accordance with the present invention by making the fabric of a multilayer construction with a specific combination of layers, fiber compositions in the respective layers, bond structure and orientation and bonding technique. In particular, as defined in claim 1, the nonwoven fabric includes:

- A first fibrous layer which defines one outer surface of the nonwoven fabric.
- A second fibrous layer which defines the opposite outer surface of the fabric.
- The first fibrous layer includes a blend of bicomponent or biconstituent fibers and monocomponent fibers.
- The bicomponent or biconstituent fibers include a first component of a relatively higher fusion point polypropylene and a second component of a lower fusion point polyethylene.
- The monocomponent fibers are formed of said relatively higher fusion point polypropylene.
- The second fibrous layer comprises fibers of said relatively higher fusion point polypropylene.
- A pattern of discrete fusion bonds serve to bond the fibers of the first layer and the fibers of the second layer to form a coherent multi-layer fabric.
- The fusion bonds are formed by passing the fabric through a calender nip defined between a smooth calender roll and a patterned calender roll.

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- The bonds exhibit on said one outer surface of the nonwoven fabric a relatively non-indented configuration resulting from contact with said smooth calender roll.
- The bonds on said opposite surface of the nonwoven fabric exhibit a relatively indented embossed configuration resulting from contact with said patterned calender roll.

Through this specific combination of elements, a nonwoven fabric is achieved that has greatly enhanced softness on the bicomponent or biconstituent fiber containing side of the fabric, yet maintains excellent abrasion resistance. As will be shown in more detail below, this specific combination of elements is neither anticipated nor rendered obvious by the cited prior art. Therefore, the claimed subject matter is patentable, and the Final Rejection should therefore be withdrawn.

In the Official Action, Claims 1-2, 6-8 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida et al. U.S. Patent No. 4,542,060 in view of the newly cited Reeder et al. U. S. Patent No. 6,468,931. The Final Rejection notes that Yoshida differs from the claimed invention in that it does not teach bonding the layers by means of a smooth roll and a patterned roll. However, it should be noted that Yoshida differs from the subject matter of claim 1 in many additional respects, and these differences are such that applicant's invention as a whole, would not have been obvious to a person of ordinary skill in the art.

Yoshida does not disclose a nonwoven fabric that contains polypropylene fibers in one fibrous layer and polyethylene/polypropylene bicomponent or biconstituent fibers in the other fibrous layer. Yoshida also fails to disclose first and second fibrous layers being bonded together by discrete fusion point bonds.

Specifically, in considering the examples given in Table 1, Examples 1-4 use a hot smoothing roll in the bonding operation and therefore do not produce a pattern of discrete bonds. Only Examples 5, 6 and 7 and reference Example 2 use an embossing roll. However, in Example 5, the ply A is a blend of 70% polyester (PET) fibers and 30% undrawn polypropylene fibers. In Example 6, ply A is a blend of 70% polypropylene fibers and 30% undrawn polypropylene fibers. In Example 7, the laminate consists of two outer plies (B) of 100% undrawn polypropylene fiber on opposite sides of a ply A which is a blend of 90% rayon fibers

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and 10% undrawn polypropylene fibers. Reference Example 2 is a single ply of 47% polyester (PET) fibers and 53% undrawn polypropylene fibers. None of the examples describe a bonded nonwoven fabric laminate in which the higher melting polymer component of the bicomponent fibers in one fibrous layer is also used to form fibers in the second fibrous layer. Additionally, in Table 1 of Yoshida the only examples of webs bonded by an embossing roll contain blends of fibers rather than bicomponent or biconstituent fibers.

Finally, the Yoshida reference gives no attention at all to the orientation of the smooth calender roll and the embossing roll. There is no teaching or suggestion of producing a nonwoven fabric wherein the bonds are formed by passing the fabric through a calender nip defined between a smooth calender roll and a patterned calender roll, and wherein the bonds exhibit a relatively non-indented configuration on the surface of the first fibrous layer containing the bicomponent fibers and a relatively indented embossed configuration on the exposed outer surface of the second fibrous layer.

Thus, it is clear that the Yoshida et al. reference does not teach a nonwoven fabric laminate as claimed.

The Examiner contends that the claimed invention is obvious from the combination of Yoshida and the Reeder et al. patent. In particular, the Examiner relies upon the Reeder patent for its teaching that a nonwoven fabric laminate may be thermally bonded by means of a pair of pattern rolls, a pattern roll and a smooth steel roll, a pattern roll and a rubber roll or other roll combinations. From this, the Examiner concludes that it would have been obvious to have employed a patterned roll and a smooth roll for bonding the fabric layers of Yoshida. However, even if the references are combined as proposed by the Examiner, the resulting combination still fails to arrive at the invention defined by claim 1. Neither Reeder nor Yoshida nor any combination of these two patents would cause the person of ordinary skill in the art to select the specific combination of fibrous layers as claimed, where the first fibrous layer comprises a blend of bicomponent or biconstituent fibers including a polypropylene component and a polyethylene component, blended together with monocomponent fibers formed of polypropylene. Nor is there any suggestion or motivation for making the second fibrous layer with fibers of polypropylene.

Furthermore, the Reeder patent does not describe or illustrate the particular bond relationship as claimed, namely wherein the bonds exhibit a relatively non-indented

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configuration on one surface and an indented embossed configuration on the opposite surface. Significantly, the cited prior art does not teach or motivate the person of ordinary skill in the art to orient the bonds in such a way that the non-indented bond configuration is on the surface of the first fibrous layer containing bicomponent or biconstituent fibers, and the indented embossed configuration is on the surface of the second fibrous layer containing the polypropylene fibers. Indeed, according to the portions of the Reeder patent cited by the Examiner at column 6 lines 8 to 11, Reeder actually teaches that the configuration of the heated calender rolls is not at all critical, and that any configuration could be suitably used, including a pair of pattern rolls, a pattern roll and a smooth steel roll, a pattern roll and a rubber roll, or other roll combinations. The certainly does not lead or motivate a person of ordinary skill in the art toward the specific bond relationship as claimed, and moreover, actually teaches away from the bond relationship claimed by applicant.

Clearly, the specific combination of elements as defined in independent claim 1 would not have been obvious to a person of ordinary skill in the art based upon the combined teachings of the Yoshida reference and the Reeder reference. Therefore, the obviousness rejection is improper and should be withdrawn.

Claims 9-12 and 14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kaiser et al. U.S. Patent No. 5,491,016 in view of the Reeder patent. Kaiser discloses a fabric comprising outer layers of polypropylene staple fibers and an inner layer comprising heat shrinkable bicomponent fibers. In this construction, the bicomponent fiber web is buried within the nonwoven fabric laminate. This is an important aspect of the Kaiser et al. invention since the heat shrinkable bicomponent fibers are insulated by the outer layers and do not shrink during calendaring. *See Col. 3, lines 21-37.*

The Kaiser et al. reference does not disclose or suggest a nonwoven fabric as claimed, which includes a first fibrous layer defining one outer surface of the fabric and a second fibrous layer defining an opposite outer surface of the fabric, and wherein the first fibrous layer which defines the one outer surface of the fabric comprises bicomponent or biconstituent fibers. Nor is there any teaching or suggestion of constituting the two layers in such a way that the second layer comprises fibers of the same higher fusion point first polymer that is present in the bicomponent or biconstituent fibers of the first layer. The Kaiser reference also fails to teach or

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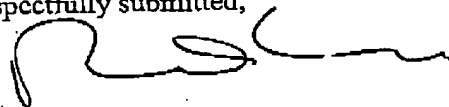
suggest the specific orientation of the bond sites as set forth in the claims. In particular, the claims specify that the bonds exhibit on the surface containing the bicomponent or biconstituent fibers a relatively non-indented configuration resulting from contact with a smooth calender roll, whereas the bonds on the opposite side of the fabric exhibit a relatively indented embossed configuration resulting from contact with the patterned calender roll.

For the reasons noted, the obviousness rejection based upon the combination of Kaiser and Reeder is improper and should be withdrawn.

In view of the foregoing, Applicant submits that the present invention as now defined in Claims 1-12 and 14-15 patentably distinguish over the prior art of record. Favorable reconsideration by the Examiner and formal notification of the allowance of these claims are respectfully solicited.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

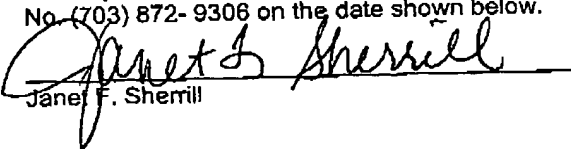


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Janet F. Sherrill

January 28, 2005
Date